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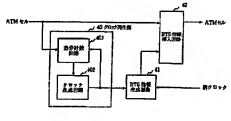
(54) CLOCK INFORMATION TRANSFER SYSTEM IN AAL TYPE ONE TRANSMISSION

(57) Abstract:

PROBLEM TO BE SOLVED: To realize communication without changing a clock information transfer system by means of a communication opposite party by permitting the repeating device of a connection part between ATM synchronous networks different in network clocks to generate RTS information with a reproduced clock and the network clock from the arriving interval of cells and to insert it into the transmitted cell.

SOLUTION: In an ATM transmission device being the repeating device of the connection part between the ATM synchronous networks different in the network clocks, a clock reproduction part 40 reproduces the clock of a transmission source CBR (fixed speed) signal by an adaptive clock method from the arriving interval of the received ATM cell. An RTS information generation circuit 41 generates RTS information based on the reproduced clock and the network clock from the reception terminal-side ATM synchronous network outputting a received input ATM cell making signal. An RTS information insertion circuit 42 inserts RTS information into a prescribed position in the ATM cell outputted to the reception terminal-side ATM synchronous network of the received input ATM cell making signal and multiplexes/outputs it.



CLAIMS

[Claim(s)]
[Claim 1]In a clock information transfer system which transmits a CBR signal among both communication terminals of a transmitting side end and a receiver end through two or more ATM synchronous networks which operate with a different network clock which contains respectively ATM transmission equipment which relays an ATM cell within the net, Said ATM transmission equipment connected to an input edge of a receiving end side ATM synchronous network, Said transmitting agency CBR signal inputted from a transmitting end side ATM synchronous network receives an ATM cell-ized signal cell-ized by AAL type 1, While reproducing a clock of the receiving ATM cell-ized signal to said transmitting agency CBR signal, based on a network clock of a receiving end side ATM synchronous network which differs in a network clock, the reproduction clock and said transmitting end side ATM synchronous network with which oneself outputs said ATM cell-ized signal, In a position which generated RTS information and as which the generated RTS information was beforehand specified to said said ATM cell-ized signal ATM cell by which the received input was carried out, insertion and by carrying out multiplex and outputting to said receiving end side ATM synchronous network. A clock information transfer system in AAL type 1 transmission restoring said transmitting agency CBR signal in an outgoing end of this receiving end side ATM synchronous network, and transmitting to said receiving end side communication terminal.
[Claim 2]. Are characterized by comprising the following. A clock information transfer system with which the 2nd CBR signal communication terminal connected to the 2nd ATM synchronous network that synchronizes with a network clock by a different source of a clock frequency from the 1st CBR signal communication terminal connected to the 1st ATM synchronous network and said 1st ATM synchronous network communicates a CBR signal.
It is connected to an input edge of said 1st ATM synchronous network by the side of a transmitting end, The 1st SRTS method CLAD device that cell-izes a transmitting agency CBR signal inputted from said 1st CBR signal communication terminal of a transmitting agency to an ATM cell of AAL type 1 also including clock information by the SRTS method, and is outputted to said 1st ATM synchronous network as 1st ATM cell-ized signal.
1st ATM transmission equipment that is connected to an outgoing end of said 1st ATM synchronous network, relays said 1st ATM cell-ized signal inputted from said 1st SRTS method CLAD device through said 1st ATM synchronous network, and is sent out to an ATM transmission line.
It is connected to an input edge of said 2nd ATM synchronous network, reproduce a clock of said 1st ATM cell-ized signal to said transmitting agency CBR signal from said 1st ATM transmission equipment of the 1st [said] ATM synchronous network by which a received input is carried out through said ATM transmission line, and it is considered as the 1st reproduction clock, 2nd ATM transmission equipment that generates RTS information based on the 1st reproduction clock and a network clock of said 2nd ATM synchronous network, is inserted and multiplexed at an ATM cell of the 1st ATM cell-ized signal of said received input, and is outputted to said 2nd ATM synchronous network as a multiplexing ATM cell signal.

It is connected to an outgoing end of said 2nd ATM synchronous network, reproduce a clock of said transmitting agency CBR signal based on said multiplexed RTS information from said multiplexing ATM cell signal from said 2nd ATM transmission equipment inputted through said 2nd ATM synchronous network, and it is considered as the 2nd reproduction clock, The 2nd SRTS method CLAD device that reverts to said transmitting agency CBR signal from said multiplexing ATM cell signal based on the 2nd reproduction clock, and transmits to said 2nd CBR signal communication terminal.

[Claim 3]Claim 1 or a clock information transfer system in AAL type 1 transmission given in 2 characterized by comprising the following.
A clock reproduction means by which said ATM transmission equipment reproduces a clock of said transmitting agency CBR signal by the adaptive clock method from said received input ATM cell-ized signal, and outputs said 1st reproduction clock.
Said 1st reproduction clock from said clock reproduction means. An RTS information creating means which generates RTS information whether said a fixed number of 1st reproduction clocks by which oneself was reproduced by said clock reproduction means based on a network clock from said receiving end side ATM synchronous network which outputs said received input ATM cell-ized signal are equivalent to a part for what clock of said network clock.
An RTS information insertion means which inserts said RTS information from said RTS information creating means in a position specified by the SRTS method in an ATM cell outputted to said receiving end side ATM synchronous network of oneself of said received input ATM cell-ized signal, and carries out a multiplexing output.
[Claim 4]A clock information transfer system characterized by comprising the following in the AAL type 1 transmission according to claim 3.
A clock generating means which carries out the generation output of said 1st reproduction clock when it is controlled by a clock control signal, while said clock reproduction means usually generates a clock in a predetermined constant period.
Whenever an ATM cell of said received input ATM cell-ized signal is received, while counting up the amount of information of said transmitting agency CBR signal based on the ATM cell arrival interval, A clock control means to output said clock control signal and to control a cycle of said 1st reproduction clock of said clock generating means output so that said counted value is counted down with said 1st reproduction clock from said clock generating means and said counted value turns into predetermined constant value.

[Claim 5]Said clock control means calculates the number of said 1st reproduction clocks of the amount of clock information of said transmitting agency CBR signal included in said received input ATM cell-ized signal, and said clock generating means output, A clock information transfer system in the AAL type 1 transmission according to claim 4 constituting from a difference counting circuit by an updown counter which said output difference part value will increase if said 1st reproduction clock is later than clock information of said transmitting agency CBR signal, and will decrease if early.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention about the clock information transfer system in AAL type 1 (ATM Adaptation Layer Type1) transmission, The clock information of the transmitting side at the time of transmitting especially a fixed speed (Constant Bit Rate:CBR) signal by the ATM cell (ATM:Asynchronous Transfer Mode) of AAL type 1 via an ATM transmission line. It is related with the clock information transfer system in AAL type 1 transmission to transmit.
[0002]
[Description of the Prior Art]As a method which reproduces the clock by the side of the transmitting end in the case of transmitting the clock information by the side of the transmitting end in the case of cell-izing a CBR signal to the ATM cell of AAL type 1, and transmitting it to it to the receiving end side via an ATM transmission line by the receiving end side, There are the SRTS method (SRTS:Synchronous Residual Type Stamp) and the adaptive clock method which are written in the written advice I.363 of ITU-T (old CCITT). The former SRTS method is what is used when the device by the side of a transmitting end and a receiving end is connected on the same ATM synchronous network, Carry out multiplex [of the RTS information (RTS:Residual Time Stamp) whether a fixed number of clocks of the CBR signal of a transmitting agency are equivalent to a part for what clock of a network clock] to an ATM cell, and it sends to the receiving end side, In the receiving end side, it is a method which reproduces the clock by the side of a transmitting end from the RTS information and network clock which were received. The latter adaptive clock method is what is used when the device by the side of a transmitting end and a receiving end is not connected on the same ATM synchronous network, After decomposing a CBR signal from an ATM cell by the receiving end side, the CBR signal is memorized to a buffer memory, It is a method which reads the CBR signal from the buffer memory so that the CBR signal memorized by that buffer memory after that may be maintained at a constant rate, and a read clock when reading a CBR signal from this buffer memory is a method used as the clock of the CBR signal of a transmitting agency.
[0003]
[Problem(s) to be Solved by the Invention]Since it is a premise to use a common network clock by the transmitting end and receiving end side, since network clocks differ by the transmitting end and receiving end side, transmission of the clock information by this conventional SRTS method cannot be used by communication between international. Although it is usable also in communication between international, transmission of the clock information by the adaptive clock method, Compared with the CLAD device (CLAD:Cell Assembler and Disassembler) of the SRTS method, since control was complicated, it became an expensive device, and there was a fault, like the quality of a reproduction clock is bad.
[0004]Therefore, when the transmitting side device and the receiving side device are connected into the same ATM synchronous network, Although what is necessary is just to use the method of

arranging only the CLAD device by the SRTS method and transmitting clock information, In using it, changing communication between different ATM synchronous networks from the communication in the same ATM synchronous network, Will prepare the communication terminal provided with two methods, the SRTS method and the adaptive clock method, and it will be used, changing both methods, Management -- he has to become an expensive system or must always be conscious of to which network the terminal of the partner who communicates belongs by the terminal side -- etc. had the problem of becoming complicated.

[0005]Therefore, in the system which communicates both in the ATM synchronous network as between different ATM synchronous networks with the same purpose of this invention, It is in providing the system which does not need to change the clock transmission mode by the difference in to which ATM synchronous network can unify the clock reproduction method in the communication terminal of a transceiver end into one of the SRTS methods, and the communications-partner point belongs.

[0006]

[Means for Solving the Problem]A clock information transfer system in AAL type 1 transmission by this invention, In a clock information transfer system which transmits a CBR signal among both communication terminals of a transmitting side end and a receiver end through two or more ATM synchronous networks which operate with a different network clock which contains respectively ATM transmission equipment which relays an ATM cell within the net, Said ATM transmission equipment connected to an input edge of a receiving end side ATM synchronous network, Said transmitting agency CBR signal inputted from a transmitting end side ATM synchronous network receives an ATM cell-ized signal cell-ized by AAL type 1, While reproducing a clock of the receiving ATM cell-ized signal to said transmitting agency CBR signal, based on a network clock of a receiving end side ATM synchronous network which differs in a network clock, the reproduction clock and said transmitting end side ATM synchronous network with which oneself outputs said ATM cell-ized signal, In a position which generated RTS information and as which the generated RTS information was beforehand specified to said said ATM cell-ized signal ATM cell by which the received input was carried out, insertion and by carrying out multiplex and outputting to said receiving end side ATM synchronous network. Said transmitting agency CBR signal is restored in an outgoing end of this receiving end side ATM synchronous network, and it transmits to said receiving end side communication terminal.

[0007]A clock information transfer system in AAL type 1 transmission by this invention is provided with the following.

With a network clock by a different source of a clock frequency from the 1st CBR signal communication terminal connected to the 1st ATM synchronous network, and said 1st ATM synchronous network. In a clock information transfer system with which the 2nd CBR signal communication terminal connected to the 2nd synchronizing ATM synchronous network communicates a CBR signal, It is connected to an input edge of said 1st ATM synchronous network by the side of a transmitting end, The 1st SRTS method CLAD device that cell-izes a transmitting agency CBR signal inputted from said 1st CBR signal communication terminal of a transmitting agency to an ATM cell of AAL type 1 also including clock information by the SRTS method, and is outputted to said 1st ATM synchronous network as 1st ATM cell-ized signal.

1st ATM transmission equipment that is connected to an outgoing end of said 1st ATM synchronous network, relays said 1st ATM cell-ized signal inputted from said 1st SRTS method CLAD device through said 1st ATM synchronous network, and is sent out to an ATM transmission line.

It is connected to an input edge of said 2nd ATM synchronous network, reproduce a clock of said 1st ATM cell-ized signal to said transmitting agency CBR signal from said 1st ATM transmission equipment of the 1st [said] ATM synchronous network by which a received input is carried out through said ATM transmission line, and it is considered as the 1st reproduction clock, 2nd ATM transmission equipment that generates RTS information based on the 1st reproduction clock and a

network clock of said 2nd ATM synchronous network, is inserted and multiplexed at an ATM cell of the 1st ATM cell-ized signal of said received input, and is outputted to said 2nd ATM synchronous network as a multiplexing ATM cell signal.
It is connected to an outgoing end of said 2nd ATM synchronous network, reproduce a clock of said transmitting agency CBR signal based on said multiplexed RTS information from said multiplexing ATM cell signal from said 2nd ATM transmission equipment inputted through said 2nd ATM synchronous network, and it is considered as the 2nd reproduction clock, The 2nd SRTS method CLAD device that reverts to said transmitting agency CBR signal from said multiplexing ATM cell signal based on the 2nd reproduction clock, and transmits to said 2nd CBR signal communication terminal.
A clock information transfer system in AAL type 1 transmission by this invention is provided with the following.
A clock reproduction means by which said ATM transmission equipment reproduces a clock of said transmitting agency CBR signal by the adaptive clock method from said received input ATM cell-ized signal, and outputs said 1st reproduction clock.
Said 1st reproduction clock from said clock reproduction means. An RTS information creating means which generates RTS information whether said a fixed number of 1st reproduction clocks by which oneself was reproduced by said clock reproduction means based on a network clock from said receiving end side ATM synchronous network which outputs said received input ATM cell-ized signal are equivalent to a part for what clock of said network clock.
An RTS information insertion means which inserts said RTS information from said RTS information creating means in a position specified by the SRTS method in an ATM cell outputted to said receiving end side ATM synchronous network of oneself of said received input ATM cell-ized signal, and carries out a multiplexing output.

[0008]A clock information transfer system in AAL type 1 transmission by this invention is provided with the following.
A clock generating means which carries out the generation output of said 1st reproduction clock when it is controlled by a clock control signal, while said clock reproduction means usually generates a clock in a predetermined constant period.
Whenever an ATM cell of said received input ATM cell-ized signal is received, while counting up the amount of information of said transmitting agency CBR signal based on the ATM cell arrival interval,
A clock control means to output said clock control signal and to control a cycle of said 1st reproduction clock of said clock generating means output so that said counted value is counted down with said 1st reproduction clock from said clock generating means and said counted value turns into predetermined constant value.

[0009]A clock information transfer system in AAL type 1 transmission by this invention, Said clock control means calculates the number of said 1st reproduction clocks of the amount of clock information of said transmitting agency CBR signal included in said received input ATM cell-ized signal, and said clock generating means output, If said 1st reproduction clock is later than clock information of said transmitting agency CBR signal, said output difference part value will increase, and it constitutes from a difference counting circuit by an updown counter which will decrease if early.
[0010]
[Embodiment of the Invention]Next, an embodiment of the invention is described with reference to drawings. Drawing 1 is a system configuration figure where the clock information transfer system in AAL type 1 (ATM AdaptationLayer Type1) transmission of one example of this invention is applied. Here the CBR (Constant Bit Rate) signal communication terminal 1-1 and the CBR signal communication terminal 1-2, SRTS (Synchronous Residual Type Stamp) method CLAD(Cell

Assembler and Disassembler)2-1 and ATM transmission equipment 4-1 which are connected to ATM synchronous-network A3-1. And information is transmitted via the ATM transmission equipment 4-1 and the SRTS method CLAD device 2-2 which are connected to ATM synchronous-network B3-2. And ATM synchronous-network A3-1 and ATM synchronous-network B3-2 are nets which synchronize by a source of a clock frequency different, respectively.

[0011]If composition is explained first, the clock information transfer system in AAL type 1 transmission by this invention will be provided with the following.

With the network clock by a source of a clock frequency which is different in the CBR signal communication terminal 1-1 and the ATM synchronous network 3-1 by the side of the transmitting end connected to the ATM synchronous network 3-1. In the clock information transfer system with which the CBR signal communication terminal 1-2 by the side of the receiving end connected to the synchronizing ATM synchronous network 3-2 communicates a CBR signal, It is connected to the input edge of the ATM synchronous network 3-1 by the side of a transmitting end, The SRTS method CLAD device 4-1 which cell-izes the transmitting agency CBR signal inputted from the CBR signal communication terminal 1-1 of a transmitting agency to the ATM cell of AAL type 1 also including the clock information by the SRTS method, and is outputted to the ATM synchronous network 3-1 as an ATM cell-ized signal.

ATM transmission equipment 4-1 which is connected to the outgoing end of the ATM synchronous network 3-1, relays the ATM cell-ized signal inputted from the SRTS method CLAD device 2-1 through the ATM synchronous network 3-1, and is sent out to ATM transmission line 5.

It is connected to the input edge of the ATM synchronous network 3-2, reproduce the clock of an ATM cell-ized signal to the transmitting agency CBR signal from the ATM transmission equipment 4-1 of the ATM synchronous network 3-1 by which a received input is carried out through ATM transmission line 5, and it is considered as the 1st reproduction clock, ATM transmission equipment 2-2 which generates RTS information based on the 1st reproduction clock and network clock of the ATM synchronous network 3-2, is inserted and multiplexed at the ATM cell of the ATM cell-ized signal of a received input, and is outputted to the ATM synchronous network 3-2 as a multiplexing ATM cell signal.

It is connected to the outgoing end of the ATM synchronous network 2-2, reproduce the clock of a transmitting agency CBR signal based on the RTS information multiplexed from the multiplexing ATM cell signal from the ATM transmission equipment 4-2 inputted through the ATM synchronous network 3-2, and it is considered as the 2nd reproduction clock,The SRTS method CLAD device 2-2 which reverts to a transmitting agency CBR signal from a multiplexing ATM cell signal based on the 2nd reproduction clock, and transmits to the CBR signal communication terminal 1-2 by the side of a receiving end.

[0012]Next, the operation in the system configuration of drawing 1 is explained. First, the case where a signal is sent to the CBR signal communication terminal 1-2 which belongs to ATM synchronous-network B3-2 from the CBR signal communication terminal 1-1 belonging to synchronous-network A3-1 is explained. The CBR signal from the CBR signal communication terminal 1-1 is received by the SRTS method CLAD device 2-1, and the CBR signal is formed into an ATM (Asynchronous Transfer Mode) cell also including the clock information by the SRTS method, and is sent out ATM synchronous-network A3-1. The ATM cell sent out ATM synchronous-network A3-1 is sent out here to the ATM transmission equipment 4-2 only connected to ATM synchronous-network B3-2 through the transmission line 5 via the ATM transmission equipment 4-1 as a relay function. The ATM transmission equipment 4-2 reproduces the clock of the CBR signal of a transmitting agency by the adaptive clock method from a receiving ATM cell, The RTS (Residual Time Stamp) information generated on the basis of the reproduced clock and the network clock of ATM synchronous-network B3-2 is inserted in an ATM cell, multiplex is carried out, and the ATM cell by which multiplex was carried out is sent out to ATM

synchronous-network B3-2. The SRTS method CLAD device 2-2 by the side of a receiving end sends out a CBR signal to the CBR signal communication terminal 1-2 while it reproduces the clock of the CBR signal of the transmitting origin based on the RTS information by which multiplex was carried out and returns a receiving ATM cell to a CBR signal. Thus, in order to have a means to generate the RTS information in sync with the network clock of the synchronous network by which the communication terminal by the side of a receiving end is connected to the terminal area between different ATM synchronous networks and to insert the generated RTS information in an ATM cell, Also in communication between different ATM synchronous networks, the communication terminal by the side of a receiving end can receive the RTS information generated from the network clock of the ATM synchronous network to which oneself is connected, and the communication terminal by the side of a receiving end can always use the clock reproduction method by the SRTS method. Namely, by arranging the inverter which reproduces a clock by the adaptive clock method to the connection section of a different ATM synchronous network, generates the RTS information transmitted by the SRTS method from the reproduction clock, and is inserted in an ATM cell, All the CLAD devices of a final edge can consist of only CLAD devices by the SRTS method.

[0013]Although the above explained the operation in the case of sending a signal to the CBR signal terminal 1-2 from the CBR signal communication terminal 1-1, since the operation in that case of being reverse is also the same, explanation is omitted. Next, drawing 2 is a block diagram showing the ATM transmission equipment of the clock information transfer system in AAL type 1 transmission of one example of this invention. If this block drawing 2 and system configuration drawing 1 are combined and the composition of ATM transmission equipment is first explained with reference to **, ATM transmission equipment will be provided with the following.

The clock reproduction part 40 which reproduces the clock of a transmitting agency CBR signal by the adaptive clock method from a received input ATM cell-ized signal, and outputs the 1st reproduction clock.

Said 1st reproduction clock from the clock reproduction part 40. The RTS information generating circuit 41 which generates the RTS information whether a fixed number of 1st reproduction clocks with which oneself was reproduced in the clock reproduction part 40 based on the network clock from the receiving end side ATM synchronous network 3-2 which outputs a received input ATM cell-ized signal are equivalent to a part for what clock of a network clock.

The RTS information insertion circuit 42 which inserts said RTS information from the RTS information generating circuit 41 in the position specified by the SRTS method in the ATM cell outputted to the receiving end side ATM synchronous network 3-2 of oneself of a received input ATM cell-ized signal, and carries out a multiplexing output.

And the clock reproduction part 40 is provided with the following.

Usually, the clock generation circuit 402 which carries out the generation output of the 1st reproduction clock when it is controlled by a clock control signal, while generating a clock in a predetermined constant period.

Whenever the ATM cell of a received input ATM cell-ized signal is received, while counting up the amount of information of a transmitting agency CBR signal based on the ATM cell arrival interval, So that said counted value may be counted down with the 1st reproduction clock from the clock generation circuit 402 and the counted value may turn into predetermined constant value. The difference counting circuit 401 as a clock control means to output a clock control signal and to control the cycle of the 1st reproduction clock of clock generation circuit 402 output.

The difference counting circuit 401 calculates the number of the 1st reproduction clocks of the amount of clock information of a transmitting agency CBR signal, and clock generation circuit 402 output contained in a received input ATM cell-ized signal, If the 1st reproduction clock is later than the clock information of a transmitting agency CBR signal, an output difference part value will increase, and it constitutes from an updown counter which will decrease if quick. Next, when operation is explained, this ATM transmission equipment, If an ATM cell is received, the difference

counting circuit 401 in the clock reproduction part 40 will calculate the number of the clocks generated from the amount of information of the CBR signal included in the received ATM cell, and the clock generation circuit 402 in the clock reproduction part 40, and will output the difference value of each they-calculated value. The clock generation circuit 402 controls the frequency of the clock to generate by the difference value outputted from the difference counting circuit 401. Here the output difference part value of this difference counting circuit 401, If the clock generated in the clock generation circuit 402 is later than the clock of the CBR signal of a transmitting agency, a value will increase, Conversely, if quick, the output difference part value will decrease, and if the clock of the CBR signal of a transmitting agency and the clock which the clock generation circuit 402 generates are in agreement, the difference output of the difference counting circuit 401 will be maintained at a fixed value. Therefore, the clock generation circuit 402 will raise the frequency of a generated clock, if the difference output value of the difference counting circuit 401 increases, Conversely, the clock of the CBR signal of a transmitting agency and the clock whose frequency corresponded are generated by performing control which lowers the frequency of a generated clock, if it decreases, and controlling so that the difference output value of the difference counting circuit 401 becomes fixed.

[0014]The difference counting circuit 401 is realizable here by the updown counter which is counted up for the amount of information of the CBR signal included in the received ATM cell, for example, and is counted down with the generated clock from the clock generation circuit 402. The RTS information generating circuit 41 generates RTS information from the clock and transmission network clock which were generated in the clock generation circuit 402. RTS information is information whether a fixed number of clocks generated in the clock generation circuit 402 are equivalent to a part for what clock of a network clock, and some counter circuits can realize it here. The RTS information generated by the RTS information generating circuit 41 is inserted in the position specified by the SRTS method in the ATM cell which transmits by the RTS information insertion circuit 42.

[0015]

[Effect of the Invention]The effect of this invention is that communication is possible, without changing a clock information transfer system by the communications-partner point, the check of the communications-partner point and the setting variation of transmission equipment become unnecessary, and a system becomes simple.

[0016]In the ATM transmission equipment of a different ATM synchronous-network terminal area, the reason reproduces the clock of a CBR signal with the arrival interval of an ATM cell, In order to generate RTS information from the network clock of the ATM synchronous network to which the communication terminal by the side of a receiving end was connected and to insert in an ATM cell, It is because the CLAD device by the side of a receiving end can receive the RTS information generated from the network clock of the ATM synchronous network to which oneself is connected and can always perform reproduction of the clock by the SRTS method also in communication of a different ATM synchronous network.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]This invention about the clock information transfer system in AAL type 1 (ATM Adaptation Layer Type1) transmission, The clock information of the transmitting side at the time of transmitting especially a fixed speed (Constant Bit Rate:CBR) signal by the ATM cell (ATM:Asynchronous Transfer Mode) of AAL type 1 via an ATM transmission line. It is related with the clock information transfer system in AAL type 1 transmission to transmit.

[Translation done.]

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PRIOR ART

[Description of the Prior Art]As a method which reproduces the clock by the side of the transmitting end in the case of transmitting the clock information by the side of the transmitting end in the case of cell-izing a CBR signal to the ATM cell of AAL type 1, and transmitting it to it to the receiving end side via an ATM transmission line by the receiving end side, There are the SRTS method (SRTS:Synchronous ResidualType Stamp) and the adaptive clock method which are written in the written advice I.363 of ITU-T (old CCITT). The former SRTS method is what is used when the device by the side of a transmitting end and a receiving end is connected on the same ATM synchronous network, Carry out multiplex [of the RTS information (RTS:Residual Time Stamp) whether a fixed number of clocks of the CBR signal of a transmitting agency are equivalent to a part for what clock of a network clock] to an ATM cell, and it sends to the receiving end side, In the receiving end side, it is a method which reproduces the clock by the side of a transmitting end from the RTS information and network clock which were received. The latter adaptive clock method is what is used when the device by the side of a transmitting end and a receiving end is not connected on the same ATM synchronous network, After decomposing a CBR signal from an ATM cell by the receiving end side, the CBR signal is memorized to a buffer memory, It is a method which reads the CBR signal from the buffer memory so that the CBR signal memorized by that buffer memory after that may be maintained at a constant rate, and a read clock when reading a CBR signal from this buffer memory is a method used as the clock of the CBR signal of a transmitting agency.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention]The effect of this invention is that communication is possible, without changing a clock information transfer system by the communications-partner point, the check of the communications-partner point and the setting variation of transmission equipment become unnecessary, and a system becomes simple.
[0016]In the ATM transmission equipment of a different ATM synchronous-network terminal area, the reason reproduces the clock of a CBR signal with the arrival interval of an ATM cell, In order to generate RTS information from the network clock of the ATM synchronous network to which the communication terminal by the side of a receiving end was connected and to insert in an ATM cell, It is because the CLAD device by the side of a receiving end can receive the RTS information generated from the network clock of the ATM synchronous network to which oneself is connected and can always perform reproduction of the clock by the SRTS method also in communication of a different ATM synchronous network.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]Since it is a premise to use a common network clock by the transmitting end and receiving end side, since network clocks differ by the transmitting end and receiving end side, transmission of the clock information by this conventional SRTS method cannot be used by communication between international. Although it is usable also in communication between international, transmission of the clock information by the adaptive clock method, Compared with the CLAD device (CLAD:Cell Assembler and Disassembler) of the SRTS method, since control was complicated, it became an expensive device, and there was a fault, like the quality of a reproduction clock is bad.
[0004]Therefore, when the transmitting side device and the receiving side device are connected into the same ATM synchronous network, Although what is necessary is just to use the method of arranging only the CLAD device by the SRTS method and transmitting clock information, In using it, changing communication between different ATM synchronous networks from the communication in the same ATM synchronous network, Will prepare the communication terminal provided with two methods, the SRTS method and the adaptive clock method, and it will be used, changing both methods, Management -- he has to become an expensive system or must always be conscious of to which network the terminal of the partner who communicates belongs by the terminal side -- etc. had the problem of becoming complicated.
[0005]Therefore, in the system which communicates both in the ATM synchronous network as between different ATM synchronous networks with the same purpose of this invention, It is in providing the system which does not need to change the clock transmission mode by the difference in to which ATM synchronous network can unify the clock reproduction method in the communication terminal of a transceiver end into one of the SRTS methods, and the communications-partner point belongs.

[Translation done.]

MEANS

[Means for Solving the Problem]A clock information transfer system in AAL type 1 transmission by this invention, In a clock information transfer system which transmits a CBR signal among both communication terminals of a transmitting side end and a receiver end through two or more ATM synchronous networks which operate with a different network clock which contains respectively ATM transmission equipment which relays an ATM cell within the net, Said ATM transmission equipment connected to an input edge of a receiving end side ATM synchronous network, Said transmitting agency CBR signal inputted from a transmitting end side ATM synchronous network receives an ATM cell-ized signal cell-ized by AAL type 1, While reproducing a clock of the receiving ATM cell-ized signal to said transmitting agency CBR signal, based on a network clock of a receiving end side ATM synchronous network which differs in a network clock, the reproduction clock and said transmitting end side ATM synchronous network with which oneself outputs said ATM cell-ized signal, In a position which generated RTS information and as which the generated RTS information was beforehand specified to said said ATM cell-ized signal ATM cell by which the received input was carried out, insertion and by carrying out multiplex and outputting to said receiving end side ATM synchronous network. Said transmitting agency CBR signal is restored in an outgoing end of this receiving end side ATM synchronous network, and it transmits to said receiving end side communication terminal.
[0007]A clock information transfer system in AAL type 1 transmission by this invention is provided with the following.
With a network clock by a different source of a clock frequency from the 1st CBR signal communication terminal connected to the 1st ATM synchronous network, and said 1st ATM synchronous network. In a clock information transfer system with which the 2nd CBR signal communication terminal connected to the 2nd synchronizing ATM synchronous network communicates a CBR signal, It is connected to an input edge of said 1st ATM synchronous network by the side of a transmitting end, The 1st SRTS method CLAD device that cell-izes a transmitting agency CBR signal inputted from said 1st CBR signal communication terminal of a transmitting agency to an ATM cell of AAL type 1 also including clock information by the SRTS method, and is outputted to said 1st ATM synchronous network as 1st ATM cell-ized signal.
1st ATM transmission equipment that is connected to an outgoing end of said 1st ATM synchronous network, relays said 1st ATM cell-ized signal inputted from said 1st SRTS method CLAD device through said 1st ATM synchronous network, and is sent out to an ATM transmission line.
It is connected to an input edge of said 2nd ATM synchronous network, reproduce a clock of said 1st ATM cell-ized signal to said transmitting agency CBR signal from said 1st ATM transmission equipment of the 1st [said] ATM synchronous network by which a received input is carried out through said ATM transmission line, and it is considered as the 1st reproduction clock, 2nd ATM transmission equipment that generates RTS information based on the 1st reproduction clock and a network clock of said 2nd ATM synchronous network, is inserted and multiplexed at an ATM cell of

the 1st ATM cell-ized signal of said received input, and is outputted to said 2nd ATM synchronous network as a multiplexing ATM cell signal.
It is connected to an outgoing end of said 2nd ATM synchronous network, reproduce a clock of said transmitting agency CBR signal based on said multiplexed RTS information from said multiplexing ATM cell signal from said 2nd ATM transmission equipment inputted through said 2nd ATM synchronous network, and it is considered as the 2nd reproduction clock, The 2nd SRTS method CLAD device that reverts to said transmitting agency CBR signal from said multiplexing ATM cell signal based on the 2nd reproduction clock, and transmits to said 2nd CBR signal communication terminal.
A clock information transfer system in AAL type 1 transmission by this invention is provided with the following.
A clock reproduction means by which said ATM transmission equipment reproduces a clock of said transmitting agency CBR signal by the adaptive clock method from said received input ATM cell-ized signal, and outputs said 1st reproduction clock.
Said 1st reproduction clock from said clock reproduction means. An RTS information creating means which generates RTS information whether said a fixed number of 1st reproduction clocks by which oneself was reproduced by said clock reproduction means based on a network clock from said receiving end side ATM synchronous network which outputs said received input ATM cell-ized signal are equivalent to a part for what clock of said network clock.
An RTS information insertion means which inserts said RTS information from said RTS information creating means in a position specified by the SRTS method in an ATM cell outputted to said receiving end side ATM synchronous network of oneself of said received input ATM cell-ized signal, and carries out a multiplexing output.

[0008]A clock information transfer system in AAL type 1 transmission by this invention is provided with the following.
A clock generating means which carries out the generation output of said 1st reproduction clock when it is controlled by a clock control signal, while said clock reproduction means usually generates a clock in a predetermined constant period.
Whenever an ATM cell of said received input ATM cell-ized signal is received, while counting up the amount of information of said transmitting agency CBR signal based on the ATM cell arrival interval,
A clock control means to output said clock control signal and to control a cycle of said 1st reproduction clock of said clock generating means output so that said counted value is counted down with said 1st reproduction clock from said clock generating means and said counted value turns into predetermined constant value.

[0009]A clock information transfer system in AAL type 1 transmission by this invention, Said clock control means calculates the number of said 1st reproduction clocks of the amount of clock information of said transmitting agency CBR signal included in said received input ATM cell-ized signal, and said clock generating means output, If said 1st reproduction clock is later than clock information of said transmitting agency CBR signal, said output difference part value will increase, and it constitutes from a difference counting circuit by an updown counter which will decrease if early.
[0010]
[Embodiment of the Invention]Next, an embodiment of the invention is described with reference to drawings. Drawing 1 is a system configuration figure where the clock information transfer system in AAL type 1 (ATM AdaptationLayer Type1) transmission of one example of this invention is applied. Here the CBR (Constant Bit Rate) signal communication terminal 1-1 and the CBR signal communication terminal 1-2, SRTS (Synchronous Residual Type Stamp) method CLAD(Cell Assembler and Disassembler)2-1 and ATM transmission equipment 4-1 which are connected to

ATM synchronous-network A3-1. And information is transmitted via the ATM transmission equipment 4-1 and the SRTS method CLAD device 2-2 which are connected to ATM synchronous-network B3-2. And ATM synchronous-network A3-1 and ATM synchronous-network B3-2 are nets which synchronize by a source of a clock frequency different, respectively.

[0011]If composition is explained first, the clock information transfer system in AAL type 1 transmission by this invention will be provided with the following.

With the network clock by a source of a clock frequency which is different in the CBR signal communication terminal 1-1 and the ATM synchronous network 3-1 by the side of the transmitting end connected to the ATM synchronous network 3-1. In the clock information transfer system with which the CBR signal communication terminal 1-2 by the side of the receiving end connected to the synchronizing ATM synchronous network 3-2 communicates a CBR signal, It is connected to the input edge of the ATM synchronous network 3-1 by the side of a transmitting end, The SRTS method CLAD device 4-1 which cell-izes the transmitting agency CBR signal inputted from the CBR signal communication terminal 1-1 of a transmitting agency to the ATM cell of AAL type 1 also including the clock information by the SRTS method, and is outputted to the ATM synchronous network 3-1 as an ATM cell-ized signal.

ATM transmission equipment 4-1 which is connected to the outgoing end of the ATM synchronous network 3-1, relays the ATM cell-ized signal inputted from the SRTS method CLAD device 2-1 through the ATM synchronous network 3-1, and is sent out to ATM transmission line 5.

It is connected to the input edge of the ATM synchronous network 3-2, reproduce the clock of an ATM cell-ized signal to the transmitting agency CBR signal from the ATM transmission equipment 4-1 of the ATM synchronous network 3-1 by which a received input is carried out through ATM transmission line 5, and it is considered as the 1st reproduction clock, ATM transmission equipment 2-2 which generates RTS information based on the 1st reproduction clock and network clock of the ATM synchronous network 3-2, is inserted and multiplexed at the ATM cell of the ATM cell-ized signal of a received input, and is outputted to the ATM synchronous network 3-2 as a multiplexing ATM cell signal.

It is connected to the outgoing end of the ATM synchronous network 2-2, reproduce the clock of a transmitting agency CBR signal based on the RTS information multiplexed from the multiplexing ATM cell signal from the ATM transmission equipment 4-2 inputted through the ATM synchronous network 3-2, and it is considered as the 2nd reproduction clock,The SRTS method CLAD device 2-2 which reverts to a transmitting agency CBR signal from a multiplexing ATM cell signal based on the 2nd reproduction clock, and transmits to the CBR signal communication terminal 1-2 by the side of a receiving end.

[0012]Next, the operation in the system configuration of drawing 1 is explained. First, the case where a signal is sent to the CBR signal communication terminal 1-2 which belongs to ATM synchronous-network B3-2 from the CBR signal communication terminal 1-1 belonging to synchronous-network A3-1 is explained. The CBR signal from the CBR signal communication terminal 1-1 is received by the SRTS method CLAD device 2-1, and the CBR signal is formed into an ATM (Asynchronous Transfer Mode) cell also including the clock information by the SRTS method, and is sent out ATM synchronous-network A3-1. The ATM cell sent out ATM synchronous-network A3-1 is sent out here to the ATM transmission equipment 4-2 only connected to ATM synchronous-network B3-2 through the transmission line 5 via the ATM transmission equipment 4-1 as a relay function. The ATM transmission equipment 4-2 reproduces the clock of the CBR signal of a transmitting agency by the adaptive clock method from a receiving ATM cell, The RTS (Residual Time Stamp) information generated on the basis of the reproduced clock and the network clock of ATM synchronous-network B3-2 is inserted in an ATM cell, multiplex is carried out, and the ATM cell by which multiplex was carried out is sent out to ATM synchronous-network B3-2. The SRTS method CLAD device 2-2 by the side of a receiving end

sends out a CBR signal to the CBR signal communication terminal 1-2 while it reproduces the clock of the CBR signal of the transmitting origin based on the RTS information by which multiplex was carried out and returns a receiving ATM cell to a CBR signal. Thus, in order to have a means to generate the RTS information in sync with the network clock of the synchronous network by which the communication terminal by the side of a receiving end is connected to the terminal area between different ATM synchronous networks and to insert the generated RTS information in an ATM cell, Also in communication between different ATM synchronous networks, the communication terminal by the side of a receiving end can receive the RTS information generated from the network clock of the ATM synchronous network to which oneself is connected, and the communication terminal by the side of a receiving end can always use the clock reproduction method by the SRTS method. Namely, by arranging the inverter which reproduces a clock by the adaptive clock method to the connection section of a different ATM synchronous network, generates the RTS information transmitted by the SRTS method from the reproduction clock, and is inserted in an ATM cell, All the CLAD devices of a final edge can consist of only CLAD devices by the SRTS method.

[0013]Although the above explained the operation in the case of sending a signal to the CBR signal terminal 1-2 from the CBR signal communication terminal 1-1, since the operation in that case of being reverse is also the same, explanation is omitted. Next, drawing 2 is a block diagram showing the ATM transmission equipment of the clock information transfer system in AAL type 1 transmission of one example of this invention. If this block drawing 2 and system configuration drawing 1 are combined and the composition of ATM transmission equipment is first explained with reference to **, ATM transmission equipment will be provided with the following.

The clock reproduction part 40 which reproduces the clock of a transmitting agency CBR signal by the adaptive clock method from a received input ATM cell-ized signal, and outputs the 1st reproduction clock.

Said 1st reproduction clock from the clock reproduction part 40. The RTS information generating circuit 41 which generates the RTS information whether a fixed number of 1st reproduction clocks with which oneself was reproduced in the clock reproduction part 40 based on the network clock from the receiving end side ATM synchronous network 3-2 which outputs a received input ATM cell-ized signal are equivalent to a part for what clock of a network clock.

The RTS information insertion circuit 42 which inserts said RTS information from the RTS information generating circuit 41 in the position specified by the SRTS method in the ATM cell outputted to the receiving end side ATM synchronous network 3-2 of oneself of a received input ATM cell-ized signal, and carries out a multiplexing output.

And the clock reproduction part 40 is provided with the following.

Usually, the clock generation circuit 402 which carries out the generation output of the 1st reproduction clock when it is controlled by a clock control signal, while generating a clock in a predetermined constant period.

Whenever the ATM cell of a received input ATM cell-ized signal is received, while counting up the amount of information of a transmitting agency CBR signal based on the ATM cell arrival interval, So that said counted value may be counted down with the 1st reproduction clock from the clock generation circuit 402 and the counted value may turn into predetermined constant value. The difference counting circuit 401 as a clock control means to output a clock control signal and to control the cycle of the 1st reproduction clock of clock generation circuit 402 output.

The difference counting circuit 401 calculates the number of the 1st reproduction clocks of the amount of clock information of a transmitting agency CBR signal, and clock generation circuit 402 output contained in a received input ATM cell-ized signal, If the 1st reproduction clock is later than the clock information of a transmitting agency CBR signal, an output difference part value will increase, and it constitutes from an updown counter which will decrease if quick. Next, when operation is explained, this ATM transmission equipment, If an ATM cell is received, the difference counting circuit 401 in the clock reproduction part 40 will calculate the number of the clocks

generated from the amount of information of the CBR signal included in the received ATM cell, and the clock generation circuit 402 in the clock reproduction part 40, and will output the difference value of each they-calculated value. The clock generation circuit 402 controls the frequency of the clock to generate by the difference value outputted from the difference counting circuit 401. Here the output difference part value of this difference counting circuit 401, If the clock generated in the clock generation circuit 402 is later than the clock of the CBR signal of a transmitting agency, a value will increase, Conversely, if quick, the output difference part value will decrease, and if the clock of the CBR signal of a transmitting agency and the clock which the clock generation circuit 402 generates are in agreement, the difference output of the difference counting circuit 401 will be maintained at a fixed value. Therefore, the clock generation circuit 402 will raise the frequency of a generated clock, if the difference output value of the difference counting circuit 401 increases, Conversely, the clock of the CBR signal of a transmitting agency and the clock whose frequency corresponded are generated by performing control which lowers the frequency of a generated clock, if it decreases, and controlling so that the difference output value of the difference counting circuit 401 becomes fixed.

[0014]The difference counting circuit 401 is realizable here by the updown counter which is counted up for the amount of information of the CBR signal included in the received ATM cell, for example, and is counted down with the generated clock from the clock generation circuit 402. The RTS information generating circuit 41 generates RTS information from the clock and transmission network clock which were generated in the clock generation circuit 402. RTS information is information whether a fixed number of clocks generated in the clock generation circuit 402 are equivalent to a part for what clock of a network clock, and some counter circuits can realize it here. The RTS information generated by the RTS information generating circuit 41 is inserted in the position specified by the SRTS method in the ATM cell which transmits by the RTS information insertion circuit 42.

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* NOTICES *

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a system configuration figure showing the clock information transfer system in AAL type 1 transmission of one example of this invention.
[Drawing 2]It is a block diagram showing the ATM transmission equipment of the clock information transfer system in AAL type 1 transmission of one example of this invention.
[Description of Notations]
1-1 and 1-2 CBR signal communication terminal
2-1, a 2-2 SRTS method CLAD device
3-1 ATM synchronous network A
3-2 ATM synchronous network B
4-1, 4-2 ATM transmission equipment
40 Clock reproduction part
41 RTS information generating circuit
42 RTS information insertion circuit
401 Difference counting circuit
402 Clock generation circuit

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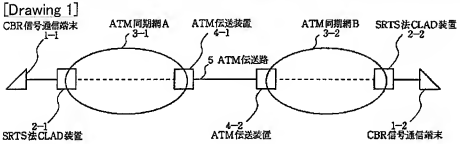
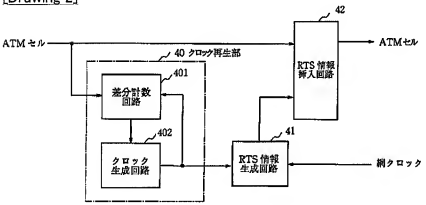
DRAWINGS

[Drawing 1]



[Drawing 2]



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